REMOTE CHARGE CONVERTER
Model 1772-X

USA Patent 11,309,855

Product description

Model 1772 Remote Charge Converters are designed for high-temperature piezoelectric (PE) (HTPE) transducers that can operate at temperatures up to + 815°C (+ 1500°F).

The circuit is connected to the PE with a high temperature coaxial cable. The circuit extends the frequency range of the PE transducer by suppressing the PE resonance and makes it possible to operate with high-temperature PE typically having resistance as low as 10 kΩ at high temperatures. The sensitivity of the circuit is not affected by the PE transducer's and cable capacitances.

Model Number Definition:
1772-1 (use with 6243MX)
1772-2 (use with 6237M70/71)
1772-3 (use with 6245)
1772-4 (use with 2278, X &Y AXIS)
1772-5 (use with 2278 Z AXIS)
1772-6 use with 2276, 2273A, 2273AM1, 2273AM20
1772-6 -10 (use with 2276, 2273A, 2273AM1, 2273AM20)

Key features and benefits

- Fixed sensitivities: 1 mV/pC for 1772-1... -6 and 10 mV /pC for 1772-6-10
- Capable to operate with PEs having resistance ⩾ 10 kΩ
- Has two-wire output
- Output signal on same 2 wires that carry supply current from constant current power supply
- Extends frequency range by suppressing PE resonance. Patented Design
- Operation over a constant current range of 8 to 20 mA and temperature range of +14°F to +212°F (-10°C to +100°C).
- RoHS Compliant

Applications

- Operates with extreme high temperature PE transducers having resistance of ⩾ 10 kΩ
- Higher frequency bandwidth measurements

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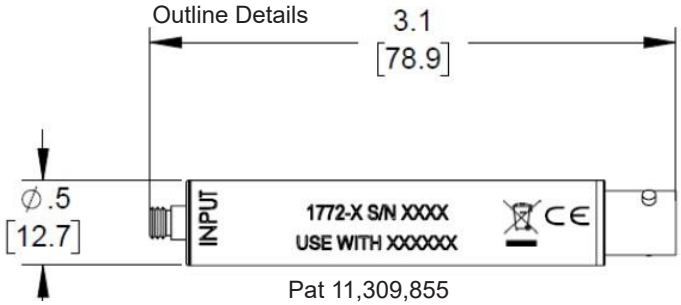
Specifications	
The following performance specifications are typical values, referenced at +75°F (+24°C) unless otherwise noted.	
Electrical Characteristics	
Input Characteristics Input Connection Source Impedance Source Resistance, R_{PE} Source Capacitance, C_{PE} Input Range	 The input is single ended with one side connected to signal ground $R_{PE} \geqslant 10$ kΩ $C_{PE} \leqslant 1000$ pF 3500 pCpk for 1772-1...-6 and 350 pCpk for 1772-6-10
Output Characteristics Output Connections Output Impedance Capacitive Load DC Output Bias Maximum Output Voltage Electrical Noise at the output C_{PE} = 50 pF Broadband noise (1 Hz - 10 kHz) Spectral density noise	 The output is single ended with one side connected to signal ground 50 Ohm maximum The output is direct coupled and requires capacitive decoupling for resistive loads +11.5 Vdc to +16.0 Vdc over all temperature range 7 Vpk-pk, 3.5 Vpk µV rms 40 µV/√Hz 1 Hz 30 10 Hz 4 100 Hz 0.2 1 kHz 0.1 10 kHz 0.1
Transfer Characteristics Gain	 1 mV/pC +2/-4% for 1772-1....-6 10 mV/pC +2/-4% for 1772-6-10

Outline Details



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Frequency Response (ref 100 Hz)
Frequency response of 1772-X alone

		1772-1	1772-2	1772-3	1772-4	1772-5	1772-6
R_{PE} > 20 kΩ	± 5 %	≤ 13 Hz – 2.7 kHz	≤ 13 Hz – 2.7 kHz	≤ 13 Hz – 2.7 kHz	≤ 13 Hz – 600 Hz	≤ 13 Hz – 5 kHz	≤ 13 Hz – 6.3 kHz
	±10%	≤ 8 Hz – 4 kHz	≤ 8 Hz – 4 kHz	≤ 8 Hz – 5 kHz	≤ 8 Hz – 800 Hz	≤ 8 Hz – 6 kHz	≤ 8 Hz – 8.5 kHz
	- 3 dB	≤ 3.5 Hz – 5.6 kHz	≤ 3.5 Hz – 6.7 kHz	≤ 3.5 Hz – 7 kHz	≤ 3.5 Hz – 2 kHz	≤ 3.5 Hz– 8.5 kHz	≤ 3.5 Hz– 12.8 kHz
R_{PE} = 20 kΩ	± 5 %	6 Hz - 3 kHz	6 Hz - 3 kHz	6 Hz - 3.5 kHz	6 Hz – 600 Hz	6 Hz - 5 kHz	6 Hz – 6.3 kHz
	±10%	4 Hz - 4 kHz	4 Hz - 4 kHz	4 Hz - 4 kHz	4 Hz – 800 Hz	4 Hz - 6 kHz	4 Hz – 8.5 kHz
	- 3 dB	2 Hz - 6 kHz	2 Hz - 7 kHz	2 Hz - 7 kHz	2 Hz - 2 kHz	2 Hz -8.5 kHz	2 Hz –12.8 kHz
R_{PE} = 10 kΩ:	± 5 %	3 Hz - 3 kHz	3 Hz - 3 kHz	3 Hz –3.5 kHz	3 Hz – 600 Hz	3 Hz - 5 kHz	3 Hz – 6.3 kHz
	±10%	2.7 Hz – 4 kHz	2.7 Hz - 4 kHz	2.7 Hz - 4 kHz	2.7 Hz –800 Hz	2.7 Hz–6 kHz	2.7 Hz –8.5 kHz
	- 3 dB	2 Hz - 6 kHz	2 Hz - 7 kHz	2 Hz - 7 kHz	2 Hz - 2 kHz	2 Hz- 8.5 kHz	2 Hz –12.8 kHz

Frequency response of 1772-6-10 alone:

1772-6-10								
R_{PE} > 200 kΩ	± 5 %	≤ 20 Hz – 6.3 kHz	R_{PE}= 200 kΩ	± 5 %	15 Hz–6.3 kHz	R_{PE} =100 kΩ	± 5 %	8 Hz–6.3 kHz
	±10%	≤ 14 Hz – 8.5 kHz		±10%	10 Hz–8.5 kHz		±10%	7 Hz–8.5 kHz
	- 3 dB	≤ 7 Hz – 12.8 kHz		- 3 dB	6 Hz–12.8 kHz		- 3 dB	5 Hz–12.8 kHz

Frequency response of HT PE transducers alone (typical plots are shown in Figures 1,2,3,4,5 and 6)

	6243MX	6237M70/71	6245	2278 (X&Y)	2278 (Z):	2276, 2273A, 2273AM1, 2273AM20
± 5 %	1 Hz - 2 kHz	1 Hz - 3 kHz	1 Hz - 3 kHz	1 Hz – 600 Hz	1 Hz – 4 kHz	1 Hz – 6 kHz
±10%	1 Hz – 3 kHz	1 Hz - 5 kHz	1 Hz - 4 kHz	1 Hz – 800 Hz	1 Hz – 5 kHz	1 Hz – 8 kHz
± 3 dB	1 Hz - 6 kHz	1 Hz - 6 kHz	1 Hz - 6 kHz	1 Hz - 1.5 kHz	1 Hz - 6 kHz	1 Hz –12.5 kHz

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Frequency response of HT PE transducers & 1772-X (typical plots are shown in Figures 7,8,9,10,11 and 12)

		6243MX & 1772-1	6237M70/ 6237M71 & 1772-2	6245 & 1772-3	2278 (X, Y) & 1772-4	2278 (Z) & 1772-5	2276/2273A/ 2273AM1/ 2273AM20 &1772-6
R_{PE} > 20 kΩ	± 5 %	≤ 13 Hz – 5 kHz	≤ 13 Hz – 6 kHz	≤ 13 Hz – 7 kHz	≤ 13 Hz – 1.5 kHz	≤ 13 Hz – 7.5 kHz	≤ 13 Hz –11.5 kHz
	±10%	≤ 8 Hz – 6 kHz	≤ 8 Hz – 8 kHz	≤ 8 Hz – 10 kHz	≤ 8 Hz – 1.7 kHz	≤ 8 Hz – 9 kHz	≤ 8 Hz – 14 kHz
	- 3 dB	≤ 3.5 Hz – 8 kHz	≤ 3.5 Hz – 10 kHz	≤ 3.5 Hz – 12 kHz	≤ 3.5 Hz – 2.2 kHz	≤ 3.5 Hz– 10 kHz	≤ 3.5 Hz– 20 kHz
R_{PE} = 20 kΩ	± 5 %	6 Hz – 5 kHz	6 Hz – 6 kHz	6 Hz – 7 kHz	6 Hz – 1.5 kHz	6 Hz – 7.5 kHz	6 Hz –11.5 kHz
	±10%	4 Hz – 6 kHz	4 Hz – 8 kHz	4 Hz – 10 kHz	4 Hz – 1.7 kHz	4 Hz – 9 kHz	4 Hz – 14 kHz
	- 3 dB	2 Hz – 8 kHz	2 Hz – 10 kHz	2 Hz – 12 kHz	2 Hz – 2.2 kHz	2 Hz– 10 kHz	2 Hz– 20 kHz
R_{PE} = 10 kΩ:	± 5 %	3 Hz – 5 kHz	3 Hz - 6 kHz	3 Hz – 7 kHz.	3 Hz – 1.5 kHz	3 Hz - 7.5 kHz	3 Hz – 11.5 kHz
	±10%	2.7 Hz – 6 kHz	2.7 Hz - 8 kHz	2.7 Hz – 10 kHz	2.7 Hz – 1.7 kHz	2.7 Hz – 9 kHz	2.7 Hz – 14 kHz
	- 3 dB	2 Hz – 8 kHz	2 Hz - 10 kHz	2 Hz – 12 kHz	2 Hz – 2.2 kHz	2 Hz – 10 kHz	2 Hz – 20 kHz

Frequency response of HTPE transducers & 1772-6-10
(typical plot is shown in Figure 12)

2276/2273A/2273AM1/2273AM20 &1772-6-10								
R_{PE} > 200 kΩ	± 5 %	≤ 20 Hz – 11.5 kHz	R_{PE}= 200 kΩ	± 5 %	15 Hz–11.5 kHz	R_{PE} =100 kΩ	± 5 %	8 Hz–11.5 kHz
	±10%	≤ 14 Hz – 14 kHz		±10%	101 Hz–14 kHz		±10%	7 Hz–14 kHz
	- 3 dB	≤ 7 Hz – 20 kHz		- 3 dB	6 Hz–20 kHz		- 3 dB	5 Hz–20 kHz

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FIGURES

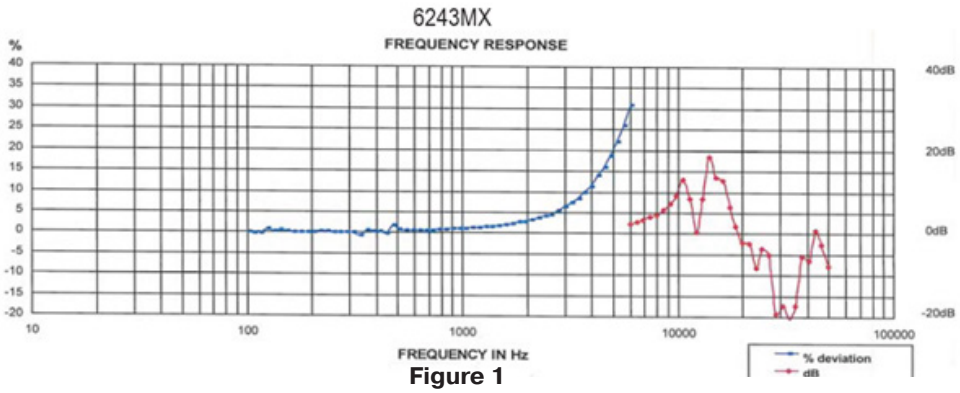

Figure 1

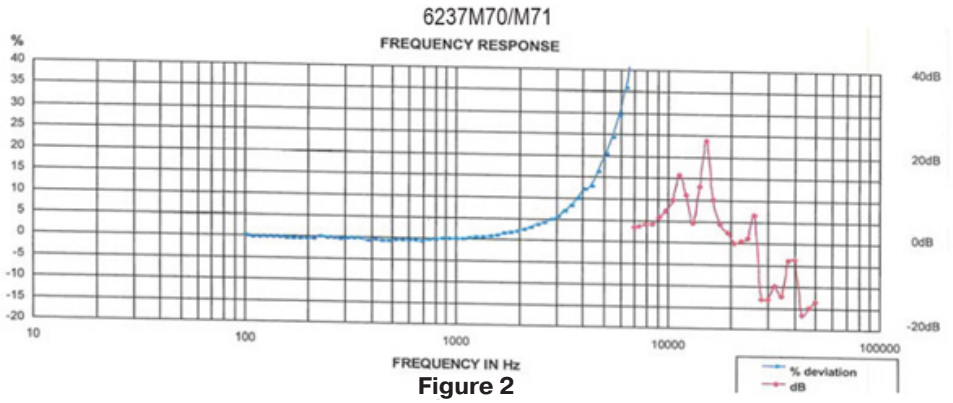

Figure 2

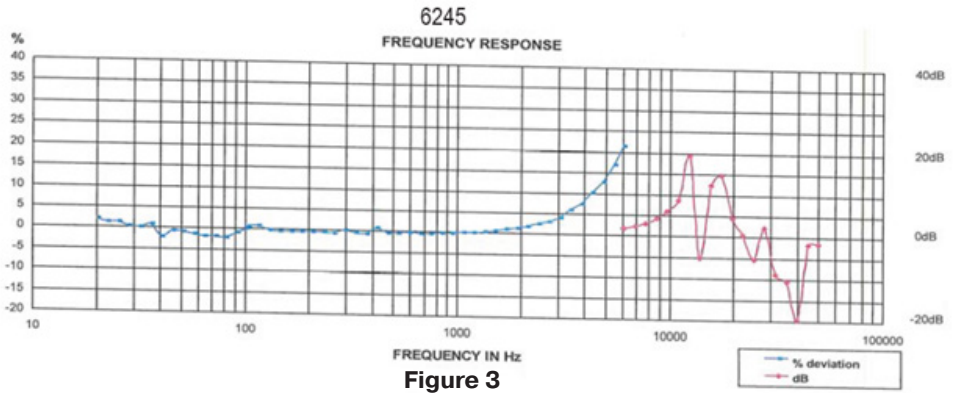

Figure 3

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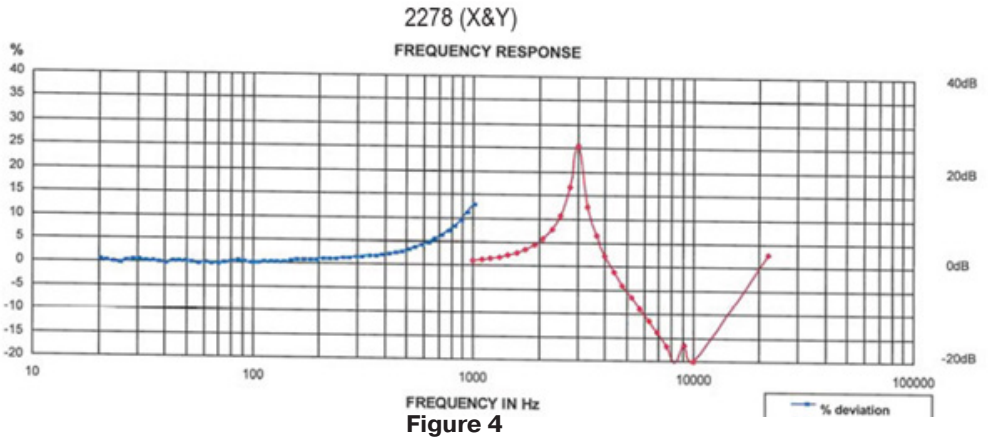

Figure 4

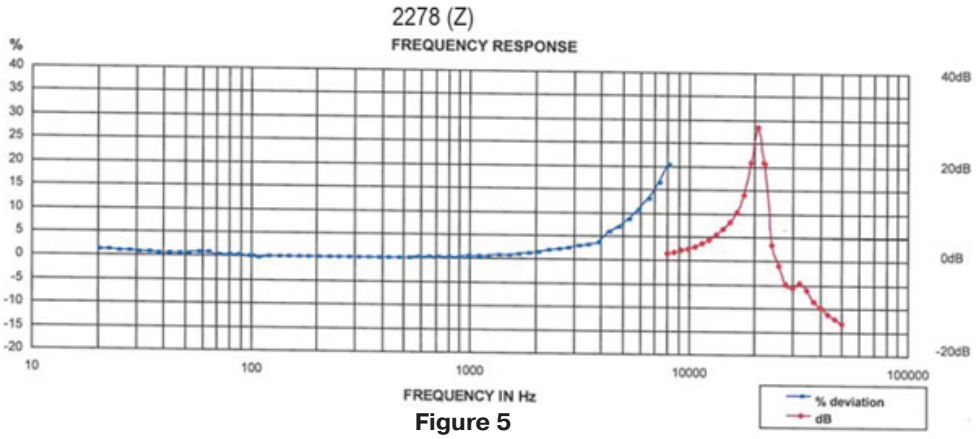

Figure 5

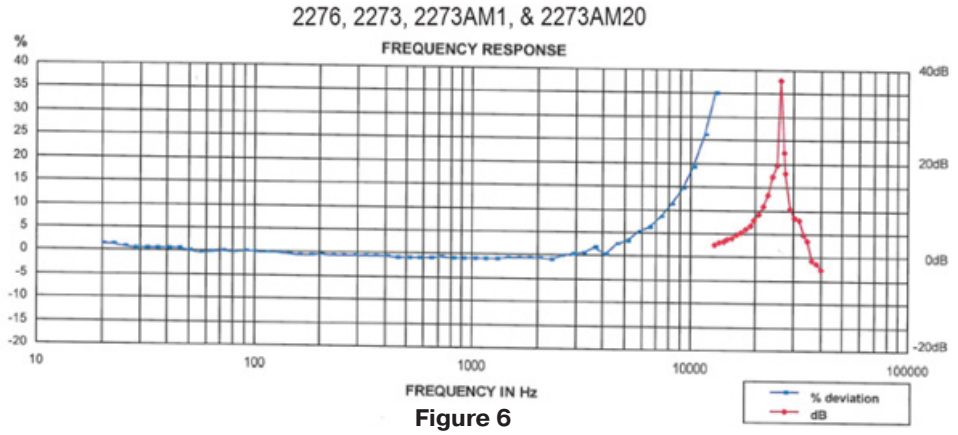

Figure 6

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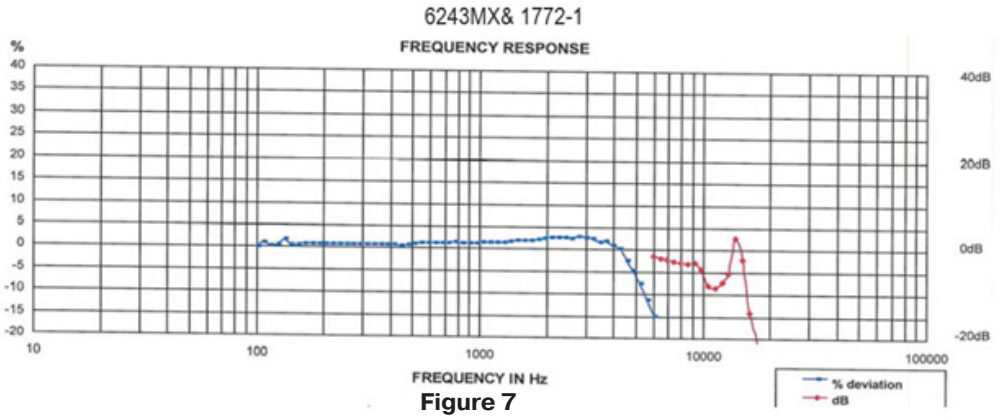

Figure 7

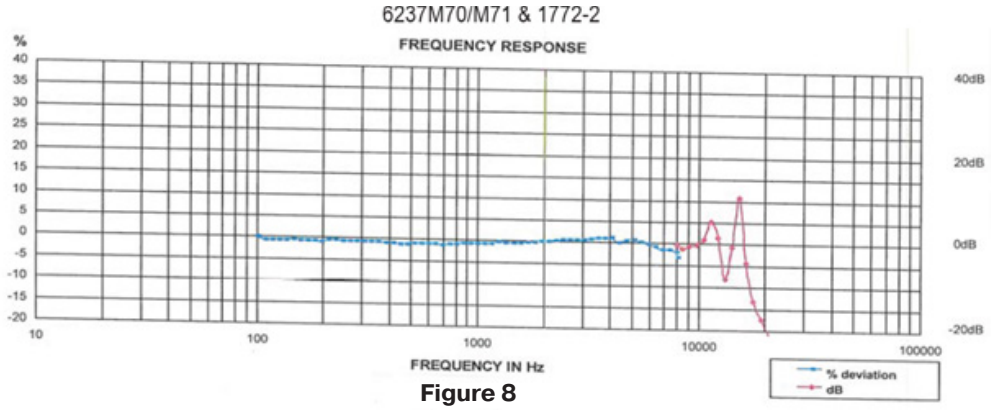

Figure 8

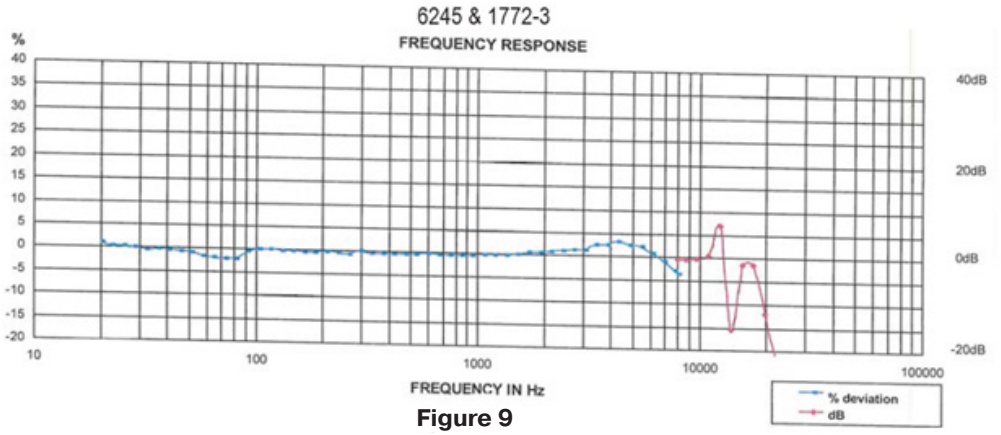

Figure 9

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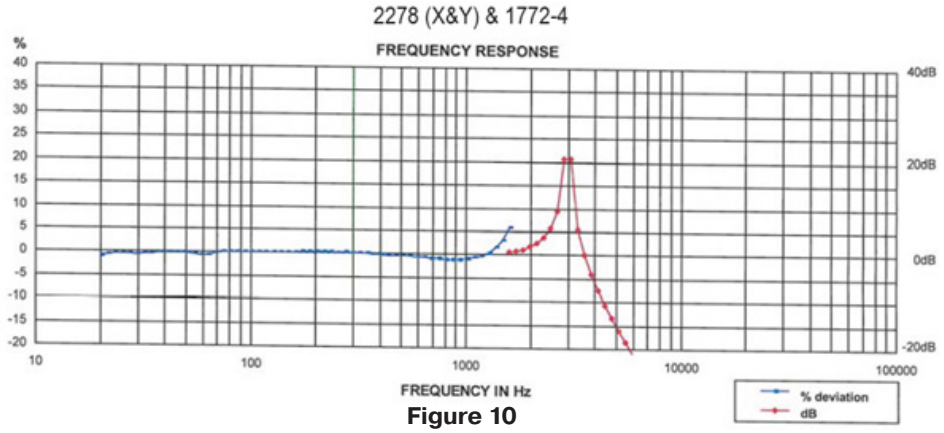

Figure 10

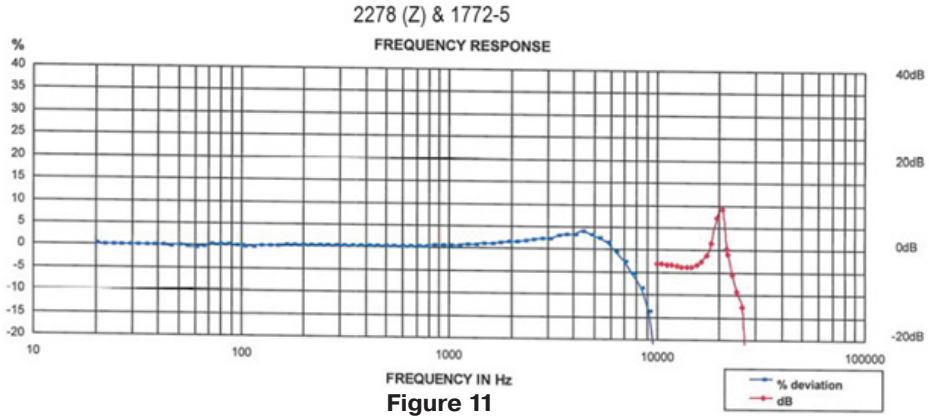

Figure 11

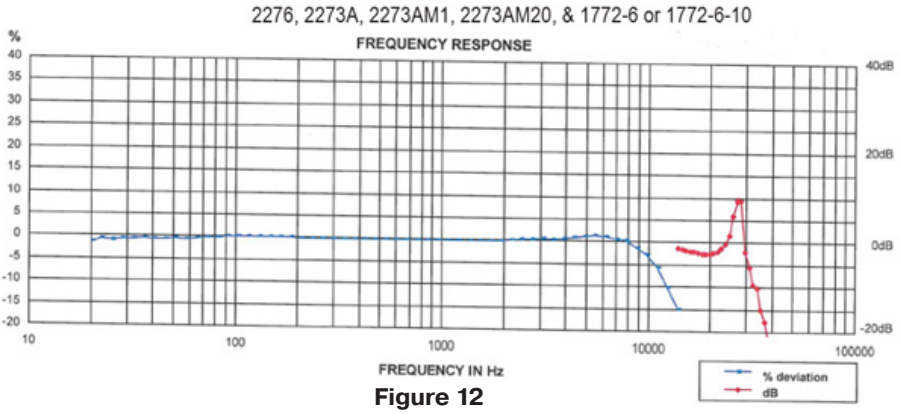

Figure 12

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Specifications	
Gain Stability	
With Temperature	The gain will change less than ±1% referred to the +25˚C gain over the temperature range +14˚F to +212˚F (-10˚C to +100˚C)
Total Harmonic Distortion	Less than 1% for output signals
Power requirements	
The remote charge converter is designed to be powered from a positive constant current supply	
Current Requirement	+8 mA to +20 mA
Voltage Supply	+24 Vdc to +30 Vdc
Warm Up Time	1.5 minutes to meet 7 V pk-pk output voltage
Physical	
Dimensions	See Outline Details, inch(mm)
Weight	Maximum 2.0 oz (56.7g)
Case Material	Stainless steel
Input Connector	Microdot Connector, S-50 series or equivalent
Output Connector	BNC Coaxial Connector
Environmental	
Temperature	
Operating Temperature	+14˚F to +212˚F (-10˚C to +100˚C)
Humidity	The unit will withstand 95% relative humidity
Vibration	20 g pk level with frequency sweep from 55 Hz to 2000 Hz
Shock	100g pk amplitude with 3.6ms have-sine pulse
Radiation	1.0 MRads (integrated Gamma)
Compliance	Industrial CE standard class A
Accessories	Optional: Model 1001-XXX Cable assembly (10-32/10-32), 10 ft, for under +550˚F (288˚C) Model 3075M6-ZZZ Cable assembly +900˚F (482˚C), Hardline Model 3076-ZZZ Cable Assembly +1000˚F (538˚C), Flexible

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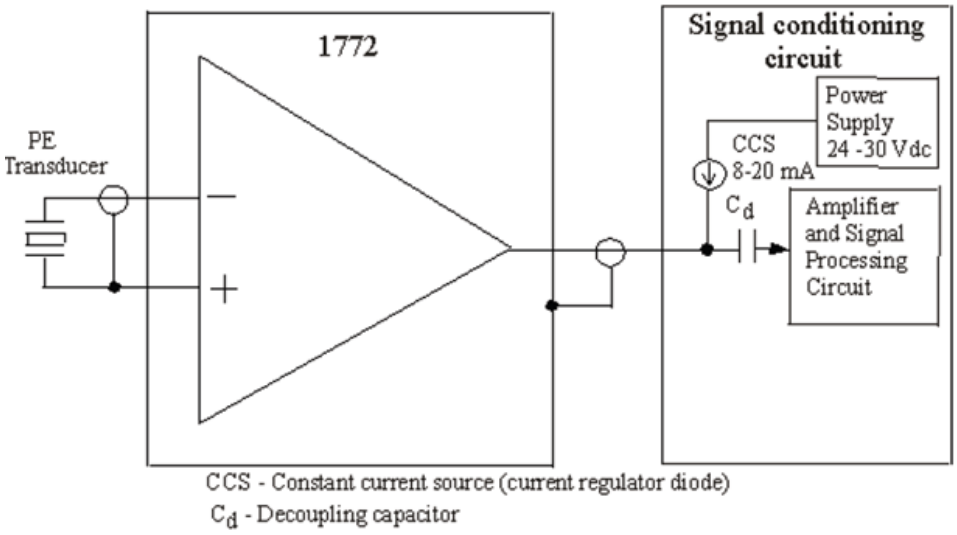
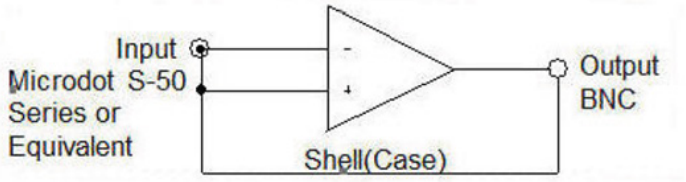
1772 Connection Diagram



AMPLIFIER BLOCK DIAGRAM



APPLIES TO CALIFORNIA FACILITY

Continued product improvement necessitates that MEGGITT reserve the right to modify these specifications without notice. MEGGITT maintains a program of constant surveillance over all products to ensure a high level of reliability. This program includes attention to reliability factors during product design, the support of stringent Quality Control requirements, and compulsory corrective action procedures. 010121

Note: Due to continuous process improvement, specifications are subject to change without notice. TCO Review # 354

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